$^{208}_{81}\mathrm{Tl}_{127}$

1 Decay Scheme

Tl-208 ground state ($J^\pi = 5^+$) decays by beta minus emission to various excited levels of Pb-208.
Le thallium 208 se désintègre par émission bêta moins vers les niveaux excités du plomb 208.

2 Nuclear Data

$T_{1/2}(^{208}\mathrm{Tl})$	:	3,058	(6)	min
$Q^-(^{208}\mathrm{Tl})$	:	4999,0	(17)	keV

2.1 β^- Transitions

	Energy keV	Probability × 100	Nature	lg ft
$\beta^-_{0,23}$	518,3 (17)	0,052 (5)	1st forbidden non-unique	6,67
$\beta^-_{0,21}$	615,7 (17)	0,017 (5)	1st forbidden non-unique	7,41
$\beta^-_{0,20}$	640,3 (17)	0,045 (4)	1st forbidden non-unique	7,04
$\beta^-_{0,19}$	675,1 (17)	0,005 (2)	allowed	8,1
$\beta^-_{0,18}$	702,4 (17)	0,102 (11)	1st forbidden non-unique	6,82
$\beta^-_{0,17}$	737,1 (17)	0,002 (1)	1st forbidden non-unique	8,6
$\beta^-_{0,13}$	818,6 (17)	0,231 (9)	1st forbidden non-unique	6,7
$\beta^-_{0,12}$	873,7 (17)	0,174 (9)	1st forbidden non-unique	6,92
$\beta^-_{0,8}$	1003,6 (17)	0,007 (3)	1st forbidden non-unique	8,5
$\beta^-_{0,7}$	1037,8 (17)	3,17 (4)	1st forbidden non-unique	5,92
$\beta^-_{0,6}$	1052,4 (17)	0,048 (3)	1st forbidden non-unique	7,76
$\beta^-_{0,5}$	1079,0 (17)	0,63 (4)	1st forbidden non-unique	6,68
$\beta^-_{0,4}$	1290,5 (17)	24,1 (2)	1st forbidden non-unique	5,38
$\beta^-_{0,3}$	1523,9 (17)	22,1 (5)	1st forbidden non-unique	5,69
$\beta^-_{0,2}$	1801,3 (17)	49,2 (6)	1st forbidden non-unique	5,61

2.2 Gamma Transitions and Internal Conversion Coefficients

	Energy keV	$P_{\gamma+ce}$ × 100	Multipolarity	α_K	α_L	α_M	α_T	α_π (10^{-4})
$\gamma_{5,4}$(Pb)	211,52 (2)	0,38 (2)	M1+3%E2	0,890 (14)	0,1570 (22)	0,0369 (6)	1,096 (17)	
$\gamma_{4,3}$(Pb)	233,37 (2)	0,51 (2)	[M1+33%E2]	0,51 (3)	0,1136 (18)	0,0275 (4)	0,66 (3)	
$\gamma_{7,4}$(Pb)	252,71 (2)	1,26 (3)	[M1+14%E2]	0,495 (14)	0,0926 (14)	0,0220 (4)	0,616 (15)	
$\gamma_{3,2}$(Pb)	277,37 (2)	10,1 (5)	[M1+0,04%E2]	0,432 (6)	0,0739 (11)	0,01730 (25)	0,529 (8)	
$\gamma_{7,3}$(Pb)	486,08 (2)	0,055 (4)	[M1]	0,0954 (14)	0,01608 (23)	0,00376 (6)	0,1164 (17)	
$\gamma_{4,2}$(Pb)	510,74 (2)	24,8 (2)	[M1+0,25%E2]	0,0835 (13)	0,01406 (21)	0,00329 (5)	0,1019 (16)	
$\gamma_{2,1}$(Pb)	583,187 (2)	86,7 (3)	E2	0,01509 (22)	0,00410 (6)	0,001009 (15)	0,0205 (3)	
$\gamma_{18,4}$(Pb)	588,109 (18)	0,06 (1)	[M1]	0,0577 (8)	0,00968 (14)	0,00226 (4)	0,0704 (10)	
$\gamma_{12,3}$(Pb)	650,27 (2)	0,043 (5)	[M1]	0,0444 (7)	0,00742 (11)	0,001733 (25)	0,0541 (8)	
$\gamma_{13,3}$(Pb)	705,34 (2)	0,023 (4)	[M1]	0,0360 (5)	0,00599 (9)	0,001399 (20)	0,0438 (7)	
$\gamma_{5,2}$(Pb)	722,26 (2)	0,25 (4)	M1+8,8%E2	0,0317 (6)	0,00534 (10)	0,001248 (22)	0,0387 (7)	
$\gamma_{6,2}$(Pb)	748,87 (2)	0,048 (3)	[M1]	0,0308 (5)	0,00512 (8)	0,001196 (17)	0,0375 (6)	
$\gamma_{7,2}$(Pb)	763,45 (2)	1,86 (2)	[M1+1,0%E2]	0,0291 (4)	0,00484 (7)	0,001130 (16)	0,0354 (5)	
$\gamma_{(-1,1)}$(Pb)	808,32 (13)	0,030 (7)						
$\gamma_{18,3}$(Pb)	821,48 (2)	0,042 (4)	M1	0,0242 (4)	0,00402 (6)	0,000939 (14)	0,0295 (5)	
$\gamma_{(-1,2)}$(Pb)	835,90 (11)	0,076 (11)						
$\gamma_{3,1}$(Pb)	860,53 (2)	12,7 (1)	[M1+0,02%E2]	0,0215 (3)	0,00356 (5)	0,000831 (12)	0,0262 (4)	
$\gamma_{20,3}$(Pb)	883,59 (2)	0,032 (3)	[M1]	0,0201 (3)	0,00333 (5)	0,000776 (11)	0,0244 (4)	
$\gamma_{12,2}$(Pb)	927,64 (2)	0,131 (7)	[M1]	0,01774 (25)	0,00293 (5)	0,000684 (10)	0,0216 (3)	
$\gamma_{13,2}$(Pb)	982,70 (2)	0,208 (8)	[M1]	0,01530 (22)	0,00253 (4)	0,000589 (9)	0,0186 (3)	
$\gamma_{4,1}$(Pb)	1093,90 (2)	0,44 (1)	E2	0,00449 (7)	0,000844 (12)	0,000200 (3)	0,00560 (8)	
$\gamma_{19,2}$(Pb)	1126,24 (2)	0,005 (2)	E1	0,001691 (24)	0,000256 (4)	0,0000590 (9)	0,00203 (3)	0,0206 (3)
$\gamma_{20,2}$(Pb)	1160,96 (2)	0,011 (3)	[M1]	0,01000 (14)	0,001641 (23)	0,000382 (6)	0,01214 (17)	0,0259 (4)
$\gamma_{21,2}$(Pb)	1185,57 (2)	0,017 (5)	[M1]	0,00947 (14)	0,001555 (22)	0,000362 (5)	0,01151 (17)	0,0501 (7)
$\gamma_{23,2}$(Pb)	1283,04 (2)	0,052 (5)	[M1]	0,00775 (11)	0,001269 (18)	0,000295 (5)	0,00943 (14)	0,232 (4)
$\gamma_{8,1}$(Pb)	1380,89 (2)	0,007 (3)	[M1]	0,00643 (9)	0,001050 (15)	0,000245 (4)	0,00785 (11)	0,546 (8)
$\gamma_{17,1}$(Pb)	1647,32 (2)	0,002 (1)	[M1]	0,00411 (6)	0,000669 (10)	0,0001556 (22)	0,00518 (8)	1,94 (3)
$\gamma_{20,1}$(Pb)	1744,12 (2)	0,002 (1)	[M1]	0,00356 (5)	0,000578 (8)	0,0001344 (19)	0,00457 (7)	2,55 (4)
$\gamma_{1,0}$(Pb)	2614,511 (10)	100	E3	0,001708 (24)	0,000292 (4)	0,0000685 (10)	0,00246 (4)	3,71 (6)

2.3 Pb

ω_K : 0,963 (4)
$\bar{\omega}_L$: 0,379 (15)
n_{KL} : 0,811 (5)

2.3.1 X Radiations

		Energy keV		Relative probability
X_K				
	$K\alpha_2$	72,8049		59,4
	$K\alpha_1$	74,97		100
	$K\beta_3$	84,451	}	
	$K\beta_1$	84,937	}	
	$K\beta_5''$	85,47	}	34,2

		Energy keV		Relative probability
	$K\beta_2$	87,238	}	
	$K\beta_4$	87,58	}	10,3
	$KO_{2,3}$	87,911	}	
X_L				
	$L\ell$	9,184		
	$L\alpha$	10,45 – 10,551		
	$L\eta$	11,349		
	$L\beta$	12,142 – 13,015		
	$L\gamma$	14,765 – 15,216		

2.3.2 Auger Electrons

	Energy keV	Relative probability
Auger K		
KLL	56,028 – 61,669	100
KLX	68,181 – 74,969	55,5
KXY	80,3 – 88,0	7,7
Auger L	5,262 – 10,398	2745

3 Electron Emissions

		Energy keV		Electrons per 100 disint.
e_{AL}	(Pb)	5,262 - 10,398		4,50 (13)
e_{AK}	(Pb)			0,27 (3)
	KLL	56,028 - 61,669	}	
	KLX	68,181 - 74,969	}	
	KXY	80,3 - 88,0	}	
$ec_{3,2}$ T	(Pb)	189,36 - 277,37		3,50 (16)
$ec_{3,2}$ K	(Pb)	189,36 (2)		2,86 (13)
$ec_{3,2}$ L	(Pb)	261,51 - 264,33		0,49 (2)
$ec_{3,2}$ M+	(Pb)	273,52 - 277,37		0,15 (1)
$ec_{4,2}$ T	(Pb)	422,73 - 510,74		2,30 (2)
$ec_{4,2}$ K	(Pb)	422,73 (2)		1,88 (2)
$ec_{4,2}$ L	(Pb)	494,88 - 497,70		0,32
$ec_{2,1}$ T	(Pb)	495,18 - 583,19		1,70 (1)
$ec_{2,1}$ K	(Pb)	495,18 (2)		1,25 (1)
$ec_{4,2}$ M+	(Pb)	506,89 - 510,74		0,098

		Energy keV		Electrons per 100 disint.
$ec_{2,1\ L}$	(Pb)	567,33 - 570,15		0,34
$ec_{2,1\ M+}$	(Pb)	579,33 - 583,19		0,109
$ec_{1,0\ \alpha}$	(Pb)	1592,51	(1)	0,0369 (6)
$ec_{1,0\ K}$	(Pb)	2526,51	(1)	0,170 (3)
$ec_{1,0\ L}$	(Pb)	2598,65 - 2601,48		0,0291 (4)
$\beta^-_{0,23}$	max:	518,3	(17)	0,052 (5)
$\beta^-_{0,23}$	avg:	154,3	(6)	
$\beta^-_{0,21}$	max:	615,7	(17)	0,017 (5)
$\beta^-_{0,21}$	avg:	187,7	(6)	
$\beta^-_{0,20}$	max:	640,3	(17)	0,045 (4)
$\beta^-_{0,20}$	avg:	196,4	(6)	
$\beta^-_{0,19}$	max:	675,1	(17)	0,005 (2)
$\beta^-_{0,19}$	avg:	208,6	(6)	
$\beta^-_{0,18}$	max:	702,4	(17)	0,102 (11)
$\beta^-_{0,18}$	avg:	218,3	(6)	
$\beta^-_{0,17}$	max:	737,1	(17)	0,002 (1)
$\beta^-_{0,17}$	avg:	230,8	(6)	
$\beta^-_{0,13}$	max:	818,6	(17)	0,231 (9)
$\beta^-_{0,13}$	avg:	260,4	(6)	
$\beta^-_{0,12}$	max:	873,7	(17)	0,174 (9)
$\beta^-_{0,12}$	avg:	280,8	(6)	
$\beta^-_{0,8}$	max:	1003,6	(17)	0,007 (3)
$\beta^-_{0,8}$	avg:	329,7	(7)	
$\beta^-_{0,7}$	max:	1037,8	(17)	3,17 (4)
$\beta^-_{0,7}$	avg:	342,8	(7)	
$\beta^-_{0,6}$	max:	1052,4	(17)	0,048 (3)
$\beta^-_{0,6}$	avg:	348,4	(7)	
$\beta^-_{0,5}$	max:	1079,0	(17)	0,63 (4)
$\beta^-_{0,5}$	avg:	358,6	(7)	
$\beta^-_{0,4}$	max:	1290,5	(17)	24,1 (2)
$\beta^-_{0,4}$	avg:	441,5	(7)	
$\beta^-_{0,3}$	max:	1523,9	(17)	22,1 (5)
$\beta^-_{0,3}$	avg:	535,4	(7)	
$\beta^-_{0,2}$	max:	1801,3	(17)	49,2 (6)
$\beta^-_{0,2}$	avg:	649,5	(7)	

4 Photon Emissions

4.1 X-Ray Emissions

		Energy keV		Photons per 100 disint.	
XL	(Pb)	9,184 — 15,216		2,75 (12)	
$XK\alpha_2$	(Pb)	72,8049		2,03 (5)	} $K\alpha$
$XK\alpha_1$	(Pb)	74,97		3,42 (7)	}
$XK\beta_3$	(Pb)	84,451	}		
$XK\beta_1$	(Pb)	84,937	}	1,17 (3)	$K'\beta_1$
$XK\beta_5''$	(Pb)	85,47	}		
$XK\beta_2$	(Pb)	87,238	}		
$XK\beta_4$	(Pb)	87,58	}	0,353 (11)	$K'\beta_2$
$XKO_{2,3}$	(Pb)	87,911	}		

4.2 Gamma Emissions

	Energy keV	Photons per 100 disint.
$\gamma_{5,4}$(Pb)	211,52 (2)	0,18 (1)
$\gamma_{4,3}$(Pb)	233,37 (2)	0,31 (1)
$\gamma_{7,4}$(Pb)	252,71 (2)	0,78 (2)
$\gamma_{3,2}$(Pb)	277,37 (2)	6,6 (3)
$\gamma_{7,3}$(Pb)	486,08 (2)	0,049 (4)
$\gamma_{4,2}$(Pb)	510,74 (2)	22,5 (2)
$\gamma_{2,1}$(Pb)	583,187 (2)	85,0 (3)
$\gamma_{18,4}$(Pb)	588,108 (18)	0,06 (1)
$\gamma_{12,3}$(Pb)	650,27 (2)	0,041 (5)
$\gamma_{13,3}$(Pb)	705,34 (2)	0,022 (4)
$\gamma_{5,2}$(Pb)	722,26 (2)	0,24 (4)
$\gamma_{6,2}$(Pb)	748,87 (2)	0,046 (3)
$\gamma_{7,2}$(Pb)	763,45 (2)	1,80 (2)
$\gamma_{(-1,1)}$(Pb)	808,32 (13)	0,030 (7)
$\gamma_{18,3}$(Pb)	821,48 (2)	0,041 (4)
$\gamma_{(-1,2)}$(Pb)	835,90 (11)	0,076 (11)
$\gamma_{3,1}$(Pb)	860,53 (2)	12,4 (1)
$\gamma_{20,3}$(Pb)	883,59 (2)	0,031 (3)
$\gamma_{12,2}$(Pb)	927,64 (2)	0,128 (7)
$\gamma_{13,2}$(Pb)	982,70 (2)	0,204 (8)
$\gamma_{4,1}$(Pb)	1093,90 (2)	0,44 (1)
$\gamma_{19,2}$(Pb)	1126,24 (2)	0,005 (2)
$\gamma_{20,2}$(Pb)	1160,96 (2)	0,011 (3)
$\gamma_{21,2}$(Pb)	1185,57 (2)	0,017 (5)
$\gamma_{23,2}$(Pb)	1283,04 (2)	0,052 (5)

	Energy keV	Photons per 100 disint.
$\gamma_{8,1}$(Pb)	1380,89 (2)	0,007 (3)
$\gamma_{17,1}$(Pb)	1647,32 (2)	0,002 (1)
$\gamma_{20,1}$(Pb)	1744,12 (2)	0,002 (1)
$\gamma_{1,0}$(Pb)	2614,511 (10)	99,755 (4)

5 Main Production Modes

Bi – 212(α)Tl – 208

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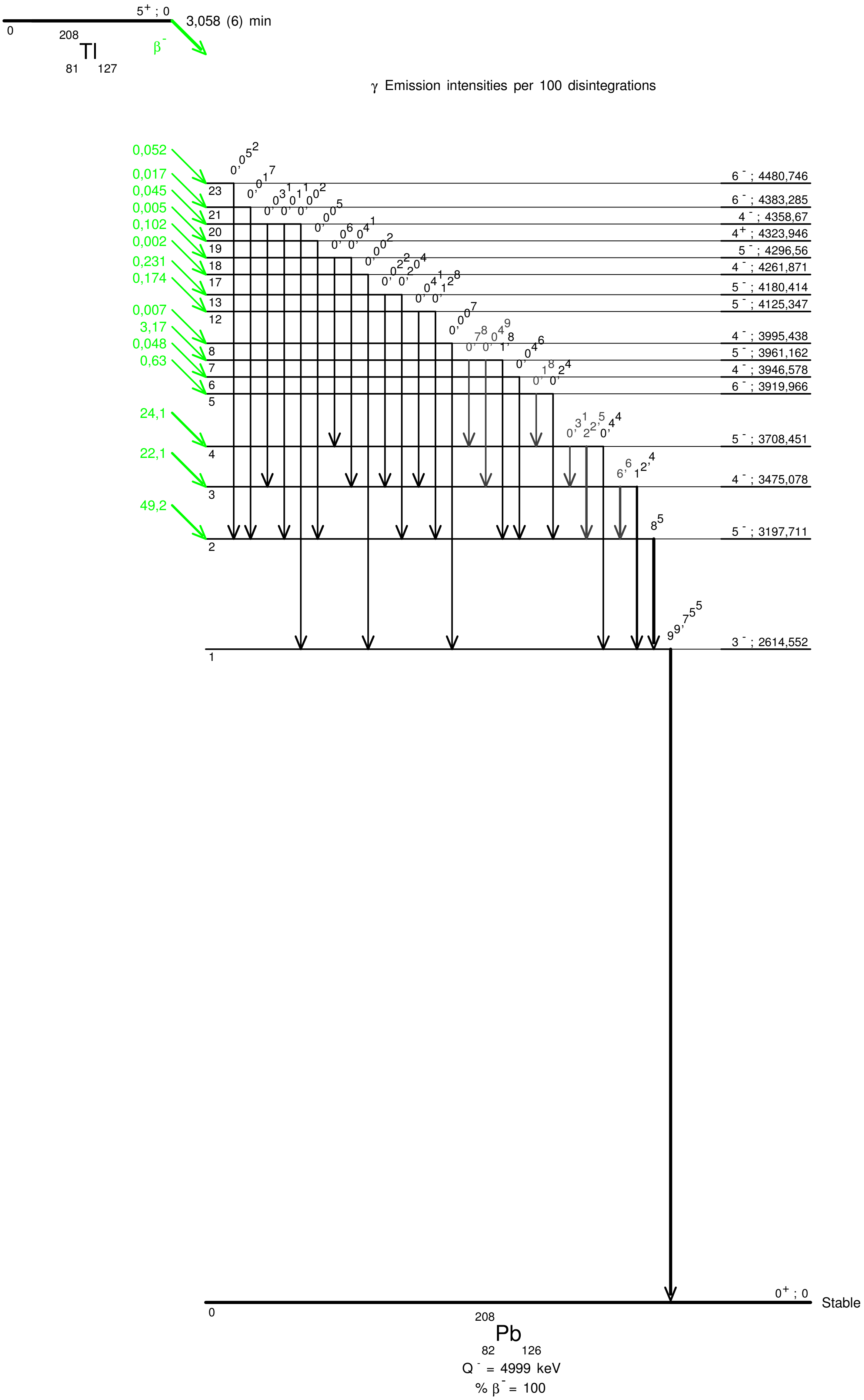
5+ ; 0
3,058 (6) min
β-
208 Tl 81 127
γ Emission intensities per 100 disintegrations
6 - ; 4480,746
6 - ; 4383,285
4 - ; 4358,67
4+ ; 4323,946
5 - ; 4296,56
4 - ; 4261,871
5 - ; 4180,414
5 - ; 4125,347
4 - ; 3995,438
5 - ; 3961,162
4 - ; 3946,578
6 - ; 3919,966
5 - ; 3708,451
4 - ; 3475,078
5 - ; 3197,711
3 - ; 2614,552
0+ ; 0
Stable
0,052
0,017
0,045
0,005
0,102
0,002
0,231
0,174
0,007
3,17
0,048
0,63
24,1
22,1
49,2
208 Pb 82 126
Q - = 4999 keV
% β- = 100